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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/706,757	11/12/2003	Stephen Y. Chou	14002-7	7832

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EXAMINER	
TRAN, BINH X	

ART UNIT	PAPER NUMBER
1765	

DATE MAILED: 03/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/706,757	CHOU ET AL.	
	Examiner	Art Unit	
	Binh X. Tran	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 February 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) *21-29* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *03/16/04, 03/15/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group I (claims 1-20) in the reply filed on 02-13-2006 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

2. Claims 21-29 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 02-13-2006.

Claim Objections

3. Claims 3, 6 are objected to because of the following informalities:

In line 7 of claim 3, the term "methylhexadecylsilox- ane" (extra blank space in between) appears to be a typo error for --methylhexadecylsiloxane--.

In line 12 of claim 3, the term "chlorotrifluorethylene-co-vinyldien- e" appears to be a typo error for -- chlorotrifluorethylene-co-vinyldiene--.

In claim 6, the examiner suggests applicants spell out what specific term that the abbreviation "DVB" and "TMPTA" stand for.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

> art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claim 18 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In claim 18, the amount of the nanoimprint resist is non-enable at 50 weight percent of an oligomer. When 50 weight percent of oligomer is selected, the total percentage of the nano-imprint is greater than 100% as shown below:

50 wt. % of oligomer + 0.01 wt. % of crosslink agent + 50 wt. % of monomer + 0.01 wt % of photoinitiator = 100.02 wt% (Note: a minimum percentage of crosslink agent, monomer and photoinitiator was selected in this example).

It is impossible to prepare/create any composition having the total percentage equal to 100.02 % by weight. The total percentage of a composition must equal to 100%.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In line 15 of claim 1, the phrase "the thin region" lacks antecedent basis.

Claims 2-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite because they depend on indefinite claim 1.

Double Patenting

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. Claims 1-4, 7-9, 15-17 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3, 14, 19 of U.S. Patent No. 5,772,905 in view of Napoli et al. (US 4,731,155).

The claims of the present application differ from the claim of US 5,772,905 by further specifying the polymeric composition capable of being deformed by said mold at a temperature of less than 200 °C. However, the US patent 5,772,905 clearly discloses the use the thermal plastic polymer which is capable of being deformed by the mold. Napoli teaches to use thermal plastic polymer comprises polymethyl methacrylate (PMMA), or homopolymers, copolymers of styrene, vinyl chloride, ester of acrylic acid or methacrylic acid, which is capable of being deformed at a temperature below 200 °C

(col. 5-6). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify US Patent 5,772,905 in view of Napoli by using thermal plastic polymer which is capable of being deformed at a temperature less than 200 °C because equivalent and substitution of one for the other would produce an expected result. Further, reducing the process temperature will reduce the energy cost.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1-2, 7-9, 16-171, 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Haisma (Mold-assisted nano-lithography: A process for reliable pattern replication, American Vacuum Society).

Respect to claims 1 and 7, Haisma discloses a nano-lithography process comprising the step of:

obtaining a mold of a material, which mold is hard relative to the film,

the film comprising a polymeric composition capable of being deformed (See Fig 2);

the mold having first and second protruding features spaced apart form each other and a recess formed thereby, the first and second features and the recess having a shape forming a mold pattern and providing at least one mold pattern lateral dimension below 100 nm (page 4124 col. 1, Fig 1, Fig 2);

urging the mold into the film under a molding pressure, wherein the thickness of the film under the protruding features of the mold being reduced thereby forming the mold pattern in the film (Fig 2b-2c, page 4125, col. 2);

removing the mold from the film (Fig 2d);

removing form the film the read of reduced thickness (thickness label "r"), thereby exposing portion of the surface of the substrate such that the exposed portions of the substrate substantially replicate the mold pattern and have at least one lateral dimension which is less than 100 nm (Fig 2e, page 4124-4125).

Haisma does not explicitly disclose the polymeric composition is capable of being deformed at a temperature of less than 200 °C. However, Haisma clearly discloses the polymeric composition is capable of being deformed. Further, Haisma teaches to heat the polymer up to 80 °C after polymer being deformed due to the molding process. (page 4125 col. 2 last line to page 4126 first line). Since the polymer is heat up to 80 °C after being deformed by the mold, the polymer must certainly is capable of being deformed by the temperature of less than 200 °C or less than 100 °C as in claim 8.

Respect to claim 2, Haisma discloses the film comprises a homopolymer, block polymer (page 4124). Respect to claim 9, Haisma discloses the polymer is a photocurable polymer (i.e. UV-cured polymer). Respect to claim 16, Haisma discloses the nano-resist comprises a mold release agent, monomers, additive (i.e. photoinitiator) (col. 1 page 4125). Respect to claim 17, Haisma discloses the nano-imprint resist comprise up to 100 weight percent of polymeric composition. Respect to claim 19,

Haisma discloses the structures have a dimension of 37.5 nm (page 4126, col. 1, read on "sub-50 nanometer").

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

14. Claims 3, 10-12, 14-15, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haisma in view of Harmening (Molding of Three Dimensional Microstructures by the Liga Process).

Respect to claim 3, Haisma fails to disclose the polymeric composition comprises poly(methyl methacrylate) or other polymer compound as listed by applicants. Harmening discloses a polymer compound comprise of poly(methyl methacrylate) (PMMA) as the material for the resist layer (page 202-203). It would have been obvious

to one having ordinary skill in the art, at the time of invention, to modify Haisma in view of Harmening by using PMMA because this compound exhibit favorable resist properties (See page 203 col. 2). Respect to claim 15, Haisma discloses the polymeric composition comprises approximately 70 weight percent of monomer (page 204, col. 1).

Respect to claims 10-12, 14 both Haisma and Harmening fails to disclose the capable curing time, the viscosity, or capable crosslinking time of the polymer material. However, Harmening clearly teaches to use a photo-curable polymer capable of crosslinking and having the identical chemical formula with applicant's polymer compound (i.e. PMMA). Viscosity and capable curing time is a property of the material. According to the MPEP 2112.01, Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present.

Respect to claim 20, Haisma fails to discloses the relative temperature of the polymeric material comparing with its glass transition temperature upon removal of the mold. Harmening discloses the polymer is above the glass transition temperature (page 206-207). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Haisma in view of Harmening by having the temperature above its glass transition temperature because it will improve the relative mobility of the material if it is above glass transition temperature (See prior arts made of record).

15. Claims 4, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haisma in view of Yamamura et al. (US 5,981,616).

Respect to claims 4 and 13, Haisma fails to disclose the polymeric composition comprise an oligomer, the oligomer comprises epoxy resin or polysiloxane. In a photo-curable composition, Yamamura teaches the polymeric composition comprises an oligomer, the oligomer comprises epoxy resin or polysiloxane (col. 3 lines 34-36, col. 16 lines 10-15). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Yamamura by using a polymeric composition comprises oligomer including epoxy resin or polysiloxane because this composition provide a cured products having excellent mechanical strength and minimize shrinkage (abstract).

16. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haisma in view of Ito et al. (US 2002/0102490 A1).

Respect to claim 1, Haisma fails to discloses the polymeric composition comprise a monomer, wherein the monomer comprises a C_8-C_{20} alkyl methacrylate, fluorinated alkyl (meth)acrylate monomer, or any combination thereof. However, Haisma clearly teaches the polymeric composition comprises monomer. Ito teaches to polymeric composition comprise monomer, wherein the monomer comprise alkyl methacrylate, fluorinated alkyl methacrylates (paragraph 0039). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Haisma in view of Ito by using the monomer comprise alkyl methacrylate, fluorinated alkyl methacrylates because it will enhance the performance of the photoresist layer.

17. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haisma in view of Sachdev et al. (US 4,894,279).

Respect to claim 6, Haisma fail to disclose the polymeric composition comprises a crosslinker, said crosslinker comprises trimethylol-propane triacrylate (TMPTA). However, Haisma clearly discloses the polymer is a UV curable. Sachdev teaches to use a UV curable polymer comprising TMPTA crosslinker. It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Haisma in view of Sachdev by using TMPTA crosslinker because it will enhance the UV curing process.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Wikipedia, http://en.wikipedia.org/wiki/Glass_transition, Glass Transition Temperature.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X. Tran whose telephone number is (571) 272-1469. The examiner can normally be reached on Monday-Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Binh Tran

Binh X. Tran